

EPO - DG 1

27 04. 2004

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Claims

1. A process for increasing the boiling point of organic nitrogen species present within a liquid hydrocarbon feed wherein said process comprises contacting a liquid hydrocarbon feed comprising an alkylating agent and organic nitrogen species, said liquid hydrocarbon feed being one or more petroleum fractions with a boiling range of 5 10-450°C selected from catalytically cracked naphtha, coker naphtha and visbroken naphtha, with an acidic catalyst at elevated temperature in a first reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content and organic nitrogen species of higher boiling point.
2. A process for reducing the nitrogen content of a liquid hydrocarbon feed wherein 10 said process comprises
 - a) contacting a liquid hydrocarbon feed comprising an alkylating agent and organic nitrogen species, said liquid hydrocarbon feed being one or more petroleum fractions with a boiling range of 10-450°C selected from catalytically cracked naphtha, coker 15 naphtha and visbroken naphtha, with an acidic catalyst at elevated temperature in a first reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content and organic nitrogen species of higher boiling point
 - b) removing the organic nitrogen species of higher boiling point to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content and a reduced nitrogen content.
- 20 3. A process according to claim 2 or 3 wherein the organic nitrogen species of higher boiling point is removed by fractionation.

4. A process according to claims 2 or 3 for reducing the sulphur and nitrogen content of a liquid hydrocarbon feed wherein said process comprises
- a) contacting a liquid hydrocarbon feed comprising an alkylating agent and organic nitrogen and organic sulphur species, said liquid hydrocarbon feed being one or more
- 5 petroleum fractions with a boiling range of 10-450°C selected from catalytically cracked naphtha, coker naphtha and visbroken naphtha, with an acidic catalyst at elevated temperature in a first reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species and organic nitrogen species of higher boiling point
- 10 b) contacting the liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species and organic nitrogen species of higher boiling point with an acidic catalyst at elevated temperature in a second reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species of higher boiling point and organic nitrogen species of higher boiling point
- 15 c) fractionating the liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species of higher boiling point and organic nitrogen species of higher boiling point to remove the organic nitrogen species of higher boiling point and the organic sulphur species of higher boiling point to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content and a reduced nitrogen and sulphur
- 20 content.
5. A process according to claims 2 or 3 for reducing the sulphur and nitrogen content of a liquid hydrocarbon feed wherein said process comprises
- a) contacting a liquid hydrocarbon feed comprising an alkylating agent and organic
- 25 nitrogen and sulphur species, said liquid hydrocarbon feed being one or more petroleum fractions with a boiling range of 10-450°C selected from catalytically cracked naphtha, coker naphtha and visbroken naphtha, with an acidic catalyst at elevated temperature in a first reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species and organic nitrogen species of higher boiling point
- 30 b) fractionating the liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species and organic nitrogen species of higher boiling point to remove the organic nitrogen species of higher boiling point to generate a liquid

hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species and a reduced nitrogen content.

- c) contacting the liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species and a reduced nitrogen content with an acidic catalyst at
5 elevated temperature in a second reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species of higher boiling point and reduced nitrogen content
- d) fractionating the liquid hydrocarbon feed comprising a reduced alkylating agent content, organic sulphur species of higher boiling point and a reduced nitrogen content
10 to remove the organic sulphur species of higher boiling point to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content and a reduced nitrogen and sulphur content.
6. A process according to anyone of the preceding claims wherein the liquid hydrocarbon feed is selected from diesel, gasoline, kerosene or jet fuel.
- 15 7. A process according to anyone of the preceding claims wherein organic nitrogen species is selected from alkyl amines, anilines, pyrroles and/or pyridines.
8. A process according to anyone of the preceding claims wherein the liquid hydrocarbon feed comprising organic nitrogen species usually has a total nitrogen content (expressed as elemental N) of between 5-3000ppm N
- 20 9. A process according to anyone of the preceding claims wherein the organic nitrogen species have a boiling point of between 50 and 450°C.
10. A process according to claims 4-9 wherein the organic sulphur species is selected from mercaptans, thiophenes and benzothiophene, dibenzothiophenes and/or hindered alkyl substituted dibenzothiophenes.
- 25 11. A process according to claims 4-10 wherein the liquid hydrocarbon feed comprising an alkylating agent and organic nitrogen and sulphur species has a total sulphur content (expressed as elemental S) of 10-50000ppm S.
12. A process according to anyone of the preceding claims wherein the acidic catalyst is a solid.
- 30 13. A process according to anyone of claims 2-12 wherein the first reaction zone is maintained at a temperature of between 50°C-300°C and at pressure of between 1-100 bar.

14. A process according to claims 4-13 wherein the second reaction zone is maintained at a temperature of between 100°C-300°C and at pressure of between 1-100 bar.

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